

KPI's and Performance Parameters

Relianeering AB is a technological consultancy company, built on years of experience with innovative development and problem solving.

Our Values

N - Networking. We consider the Networking as indicator of the company's ability to build a true relationships between our customers, partners and employees. For us the Networking is the source of trust and brings information about true needs. The information from the Network is the main driver for developing our new solutions.

E - Efficiency. The key of success is to be efficient, get the maximum from efforts given to solve a problem. Be electric motor not a gasoline combustion engine.

W - Work. Work in a smart way and get fun, instead working hard only for financial figures.



KPI's and Performance Parameters

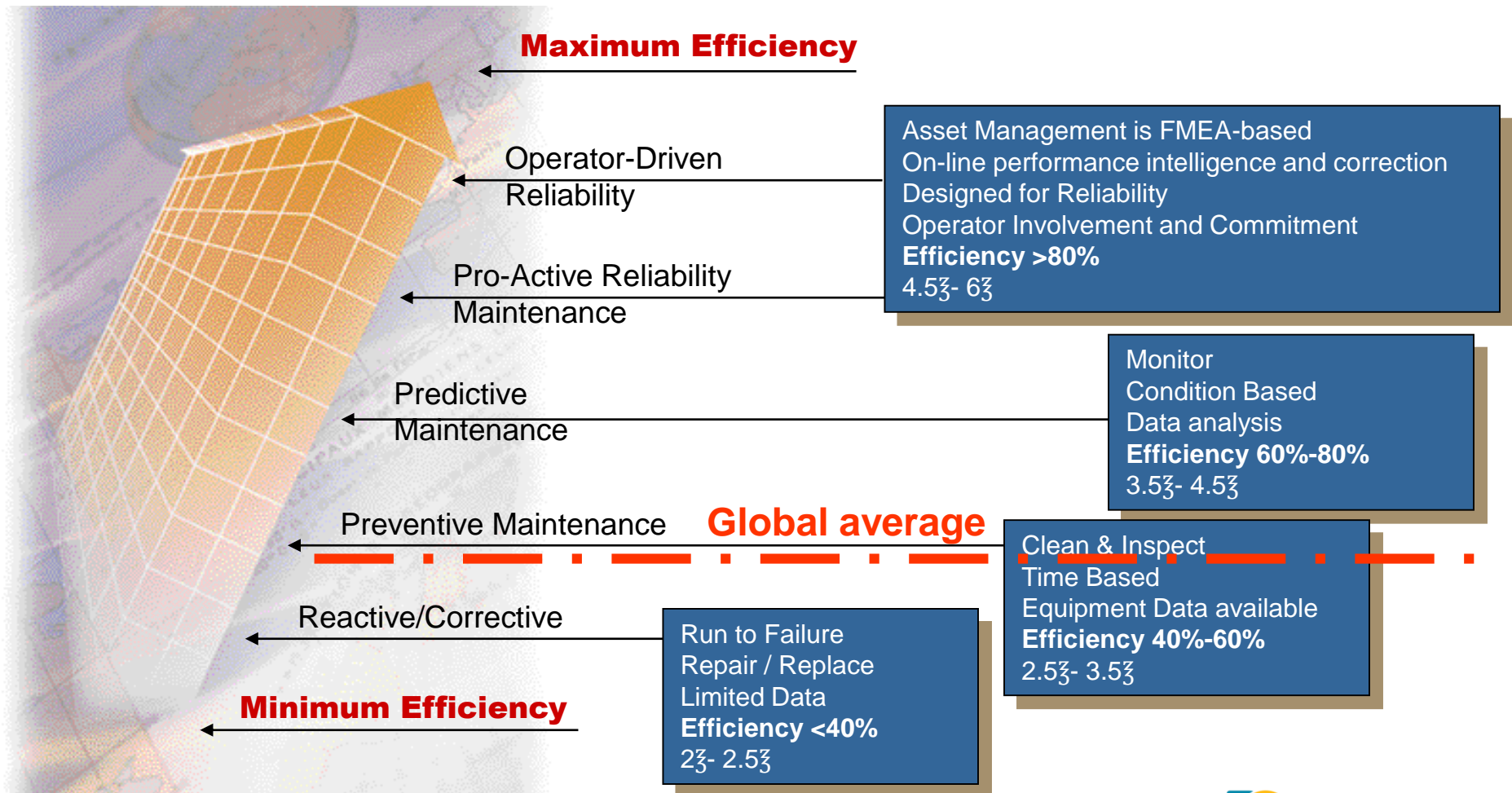
WHO WE ARE

Relianeering AB is the Innovative Knowledge Company.

- We are the next generation of engineering company simplifying the complexity.
- Our target is to deliver smart solutions and bring value to our customers.
- With years of experience from a complex world of **RELI**ability and engi**NEERING**, Relianeering is a technological consultancy company combining the gained experience and knowledge with the new mindset of next generation engineering.
- We offer you inspection services, engineering solutions, monitoring services and maintenance products based on the latest technology and mobile solutions.
- With our totally new monitoring device SES Logger connected to Hash Mobile Inspector we increase the mobility of data collection further and maintenance engineering becomes on-the-go.
- Our promise is to provide our customers with the best possible solution. Simple, Easy and Smart.

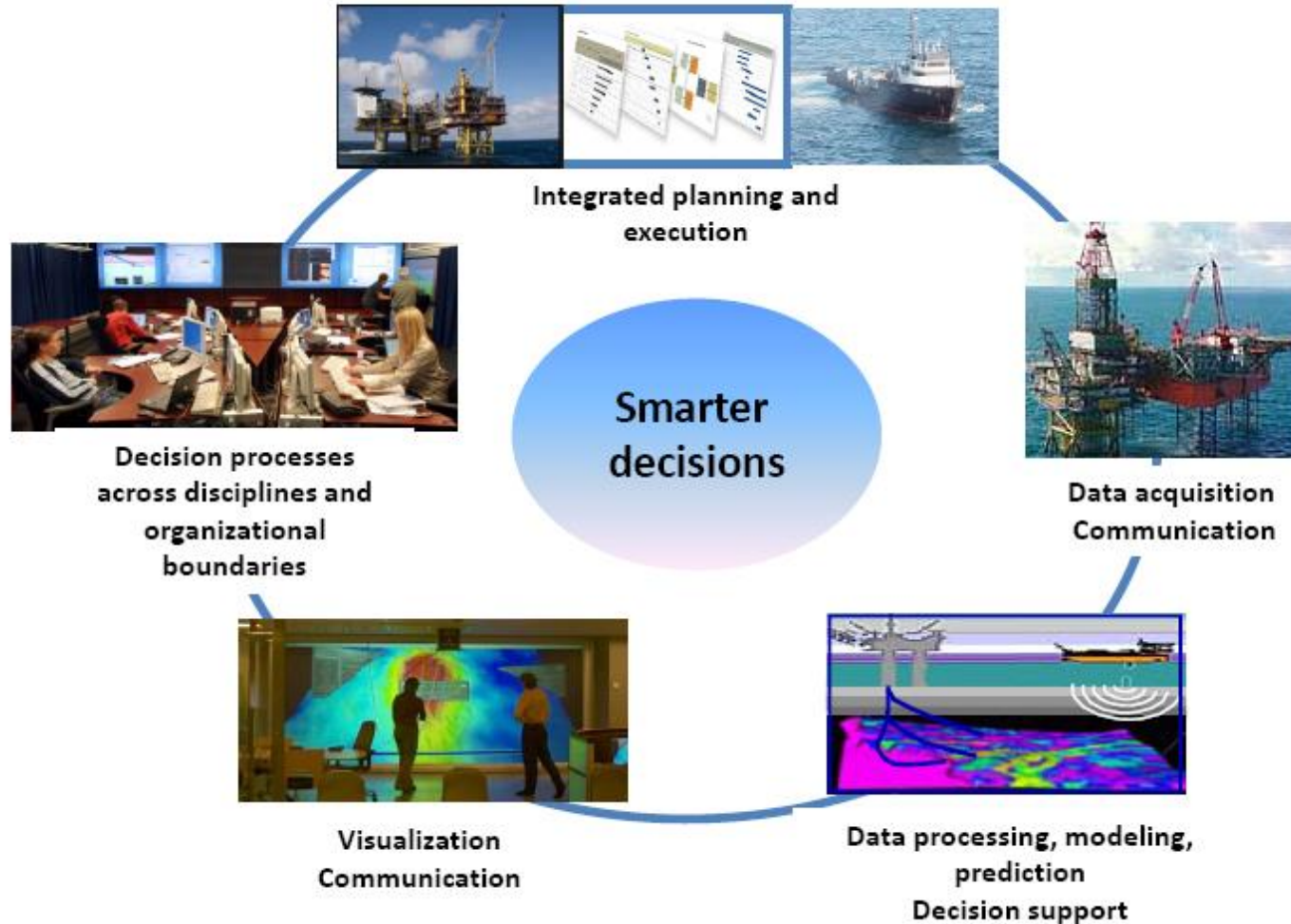


Asset Efficiency Optimization™



FMEA = Failure Mode and Effects Analysis

Integrated Operation - Asset life cycle extension



The foundation for an optimal Asset Integrity Management Program is made during the design phase:

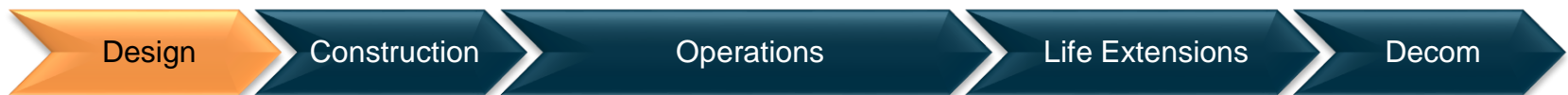
Design & Strategy Analysis

- Integrity Management Philosophy & Strategies
- Maintenance Philosophy & Strategies
- IO and CM/CBM Strategy
- Risk Assessments
- Design Review and Verification
- Material evaluation and selection
- Reliability, Availability and Maintainability analysis (RAM)
- SIL assessment
- Failure mode, effects, and criticality analysis (FMECA)
- Production availability analysis
- Operations workload analysis
- Regularity analysis
- LCC/LCI analysis
- Manning and OPEX analysis
- Work Processes
- Process Safety and Hazards Analysis (PHA/HAZOP)

Maintenance & Inspection Programs

- Maintenance & inspection management systems
- Criticality Analysis
- Reliability Centered Maintenance (RCM)
- Risk Based Inspection analysis (RBI)
- Structural Inspection Program (SIMP)
- Condition-based maintenance planning
- Integrated Operations planning

Increased focus on Integrated Operations (IO) and Condition Monitoring Strategies at an early stage to ensure equipment and systems is designed for real time condition monitoring



KPI's and Performance Parameters

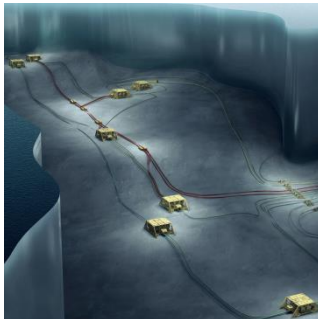
Engineering Services



Maintenance & Inspection Engineering



Structural Integrity Management



Subsea Integrity Management

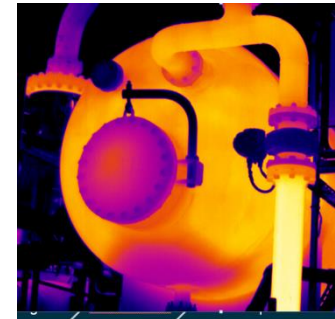


Data Management, Systems & Tools

Field Services



In-Service Inspection & Corrosion Management



Advanced Inspection & Monitoring Technology



Inspection (NDT) and Quality Control



Rope Access Services

Design

Construction

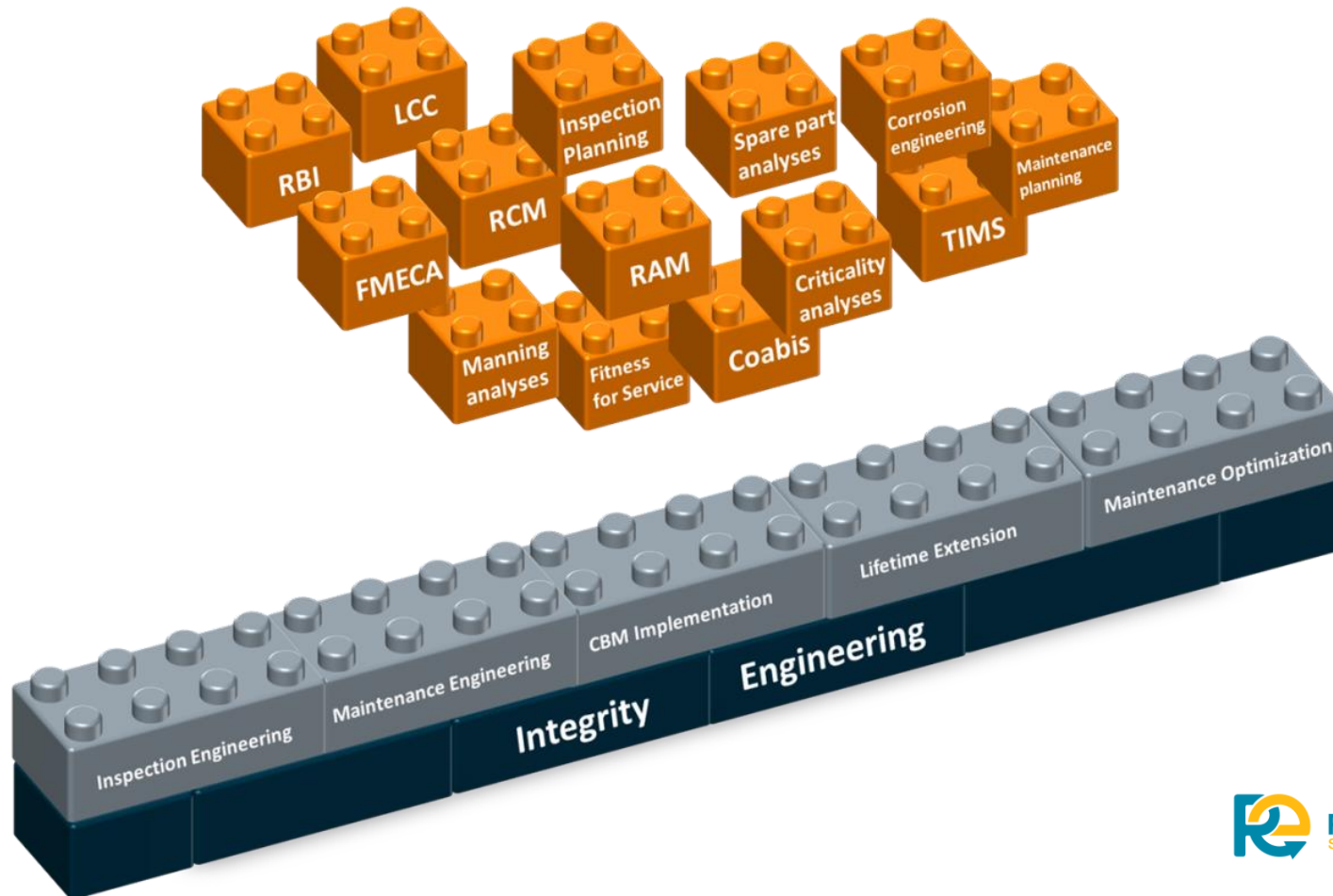
Operations

Life Extensions

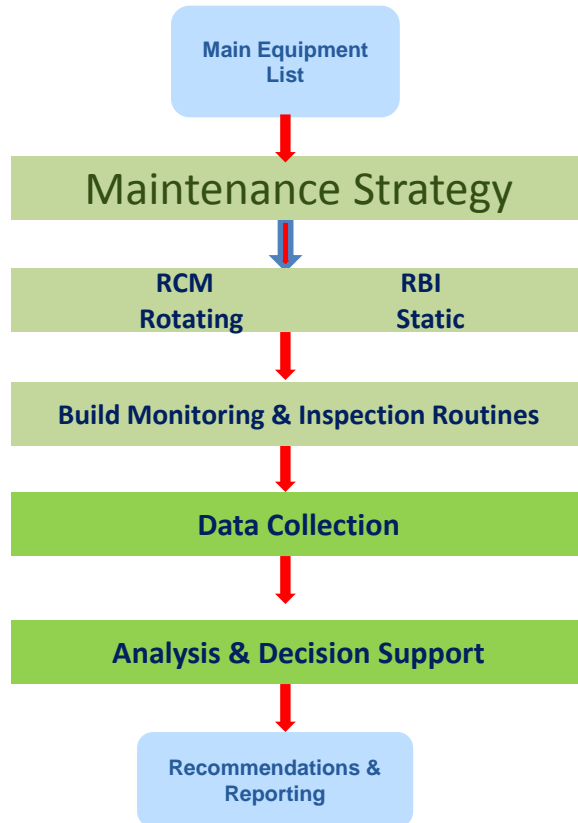
Decommissioning

Delivering all aspects of Asset Integrity Management

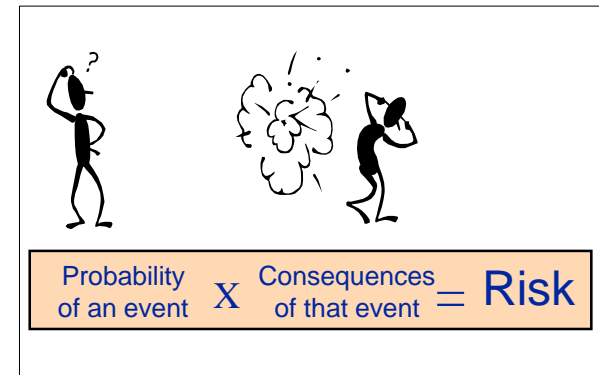
The integrity engineering projects based on the Customer needs and the development phase, operational phase and the condition of the assets



Deal with Big Data at source - Integrity Engineering



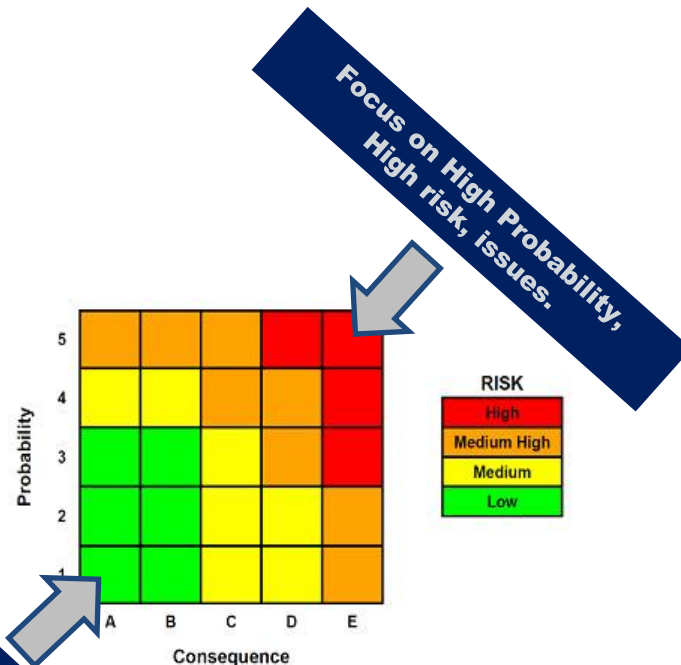
IO
FMECA
RAM
MTTF
MTTR
PF
LCC
Spares



Technical Integrity Analysis and Studies

Risk Based Inspection

- Secure optimum availability at acceptable risk.
- Prioritize inspection efforts on the items driving the risk.



Non-Intrusive Inspection (NII)

- Where the RBI identifies internal degradation mechanisms which can be followed up through periodic inspection, it is recommended to evaluate if the inspection can be performed non-intrusively.

Technical Integrity Management Services (TIMS)

- TIMS is a multidisciplinary service which brings together a unique package of expertise, tools and systems to help the Client achieve optimum asset performance.

JOINT VENTURES



RELIAENGINEERING
Simple. Easy. Smart.

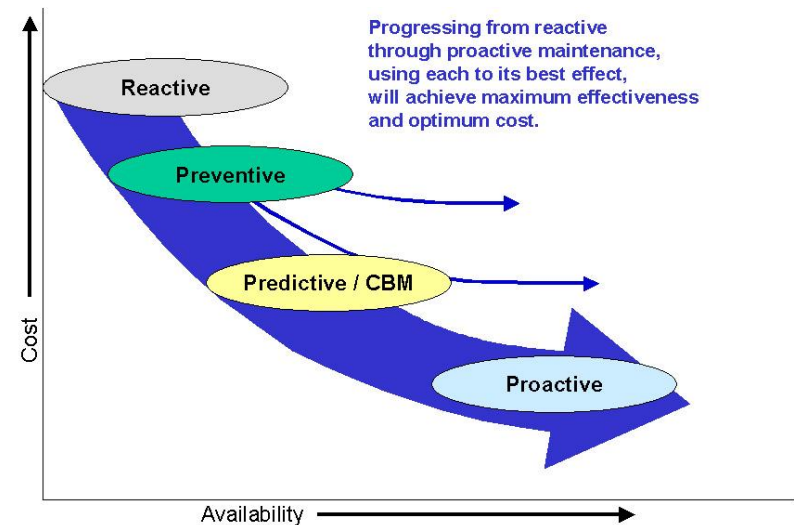
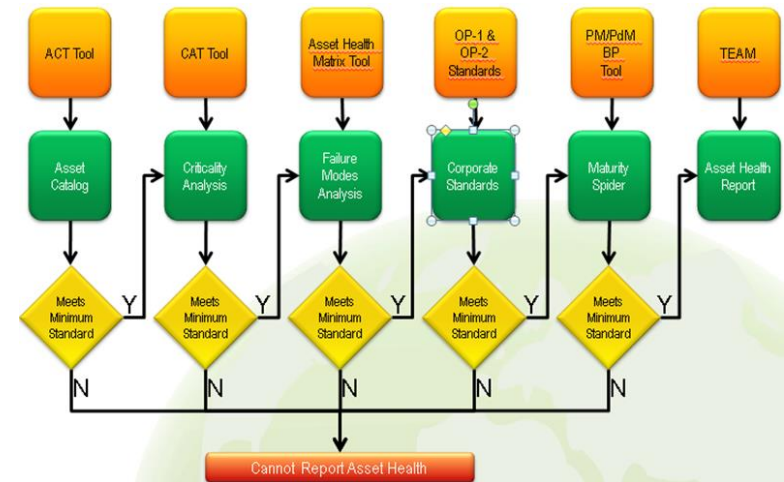
	Our mission is to make our customers workday simpler and more effective
	PSW Group's facility at Mongstad, is a flexible and multifaceted "one stop shop" Subsea & Drilling Base. Here we renders services such as engineering, inspection, maintenance, modifications and logistics to the Oil & Gas industry.
	To establish the company as a leader in implementing smart, customized and cost reducing solutions within our areas of competence by: Making tomorrow better for our customers
	Enluse BV is a European wide company, promoting products and services to assist industry in their efforts to reach global "Best Practices" in Lubrication Management.
	Comp.A.C. is certificated to ISO 9001-2008 of innovative products in the field of engine diagnostics, vibration and acoustic measurements and torque meters, based on shear stress measurements
	Rotterdam Offshore Group provides services (24/7) to the maritime and offshore industry, and an open sea accessible, strategic and ISPS location in the main port of Rotterdam, with lay-by facilities

KPI's and Performance Parameters

Integrity – Reliability optimization

At PSW Integrity our certified reliability engineers are professionals who understand the principles of performance and reliability optimization. Using our proven tools, training and processes, PSW Integrity effectively deliver the ability to manage customers assets in the most effective and efficient and safe manner throughout the asset lifecycle.

Asset Catalogue Development
Criticality Analysis/Consequence Classification
RCA (Root Cause Analysis)
RCM (Reliability Centred Maintenance)
FMA/ FMECA (Failure Mode Analysis/ Failure Mode, Effects and Criticality Analysis)
Equipment Maintenance Plans
Spares Optimization
Workflow Optimization (Planning/scheduling, etc.)
Maintenance Optimization
Lean Manufacturing
Gap Analysis (Operations & Maintenance)
Reliability Excellence
PAS 55 — ISO 55000
Human factors review and optimization
KPI dashboard
Barrier Management
Hose Management



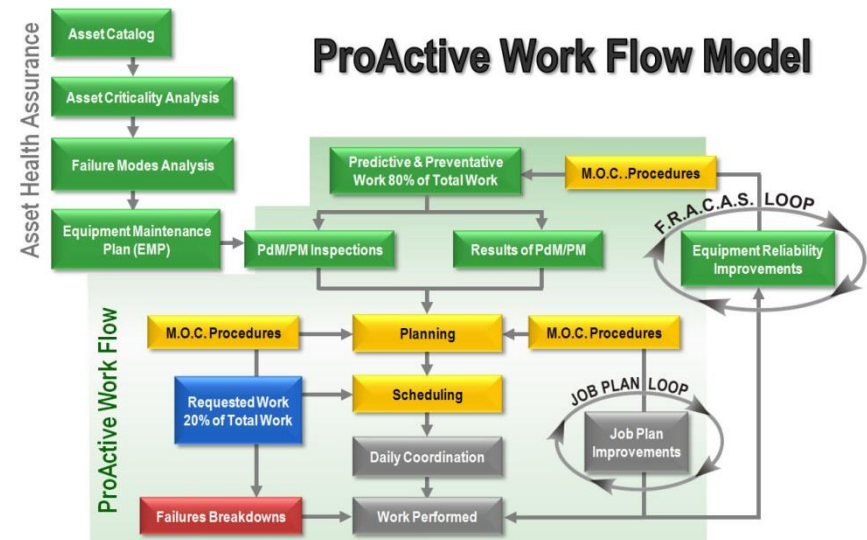
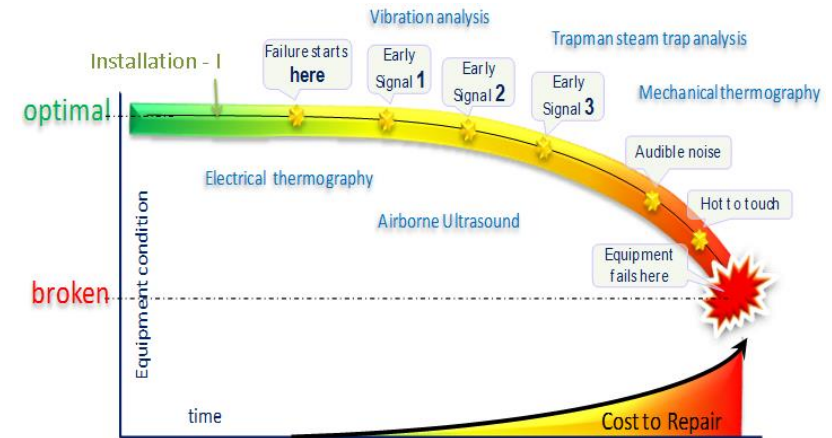
KPI's and Performance Parameters

Integrity – Condition monitoring

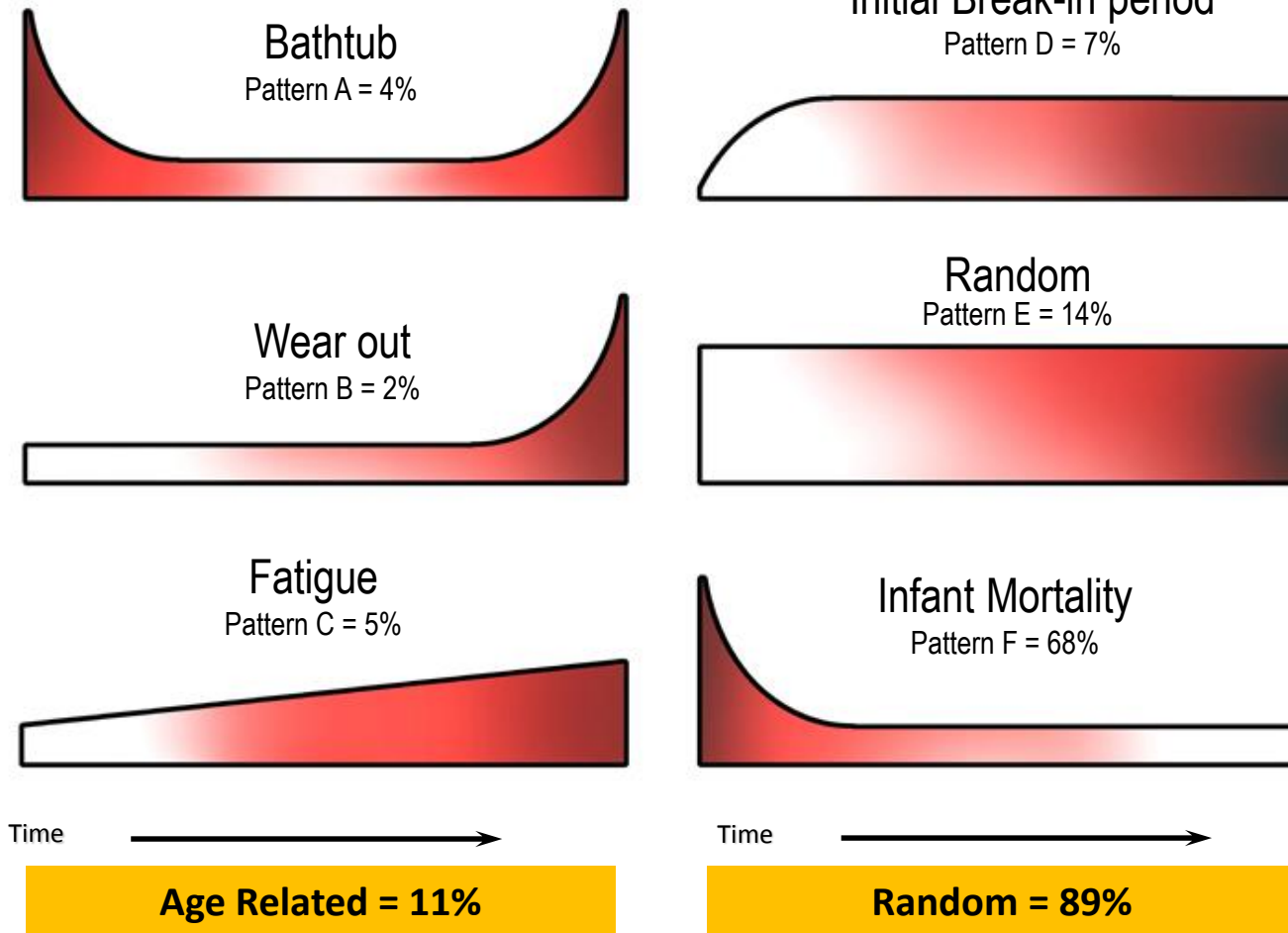
Condition Monitoring (CM) Programmes are the optimum approach towards improved reliability, reduced maintenance and costs. CM surveys have been continually proven to detect the majority of machinery problems in the most cost-effective and timely manner. Early detection of defects enables planning and drives a proactive maintenance culture. CM surveys reduce costs and also eliminate time based replacement of some equipment in SPS, shutdowns, etc. whilst increasing asset reliability.

Activities include;

- Vibration Analysis
- Ultrasound Analysis
- Infrared Analysis
- Steam Trap Analysis
- Oil sampling and Analysis
- Grease Handling
- Fluid Management
- Remote Control
- Operational Checks
- CM Assessments (Condition Monitoring)
- Visual Inspections
- CBM assessments (Condition Based Maintenance)



Integrity – Failure Patterns



What to be noticed in this figure is that only **11%** of the failures that occurs are age related.

Meaning that use of calendar based maintenance is **not** considered as best approach.

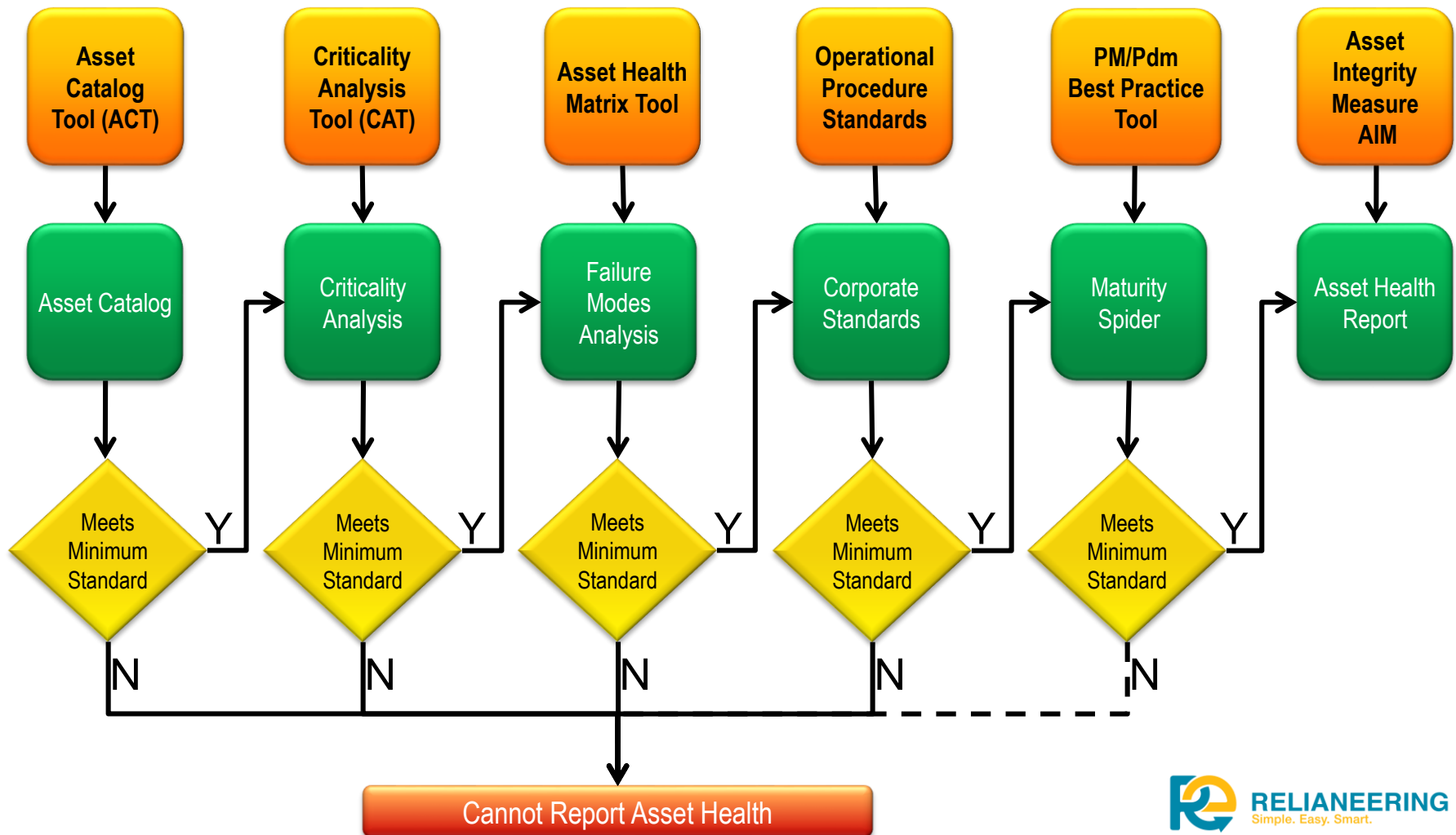
Conditioned based maintenance gives much more value for money.

Integrity – A.I.M

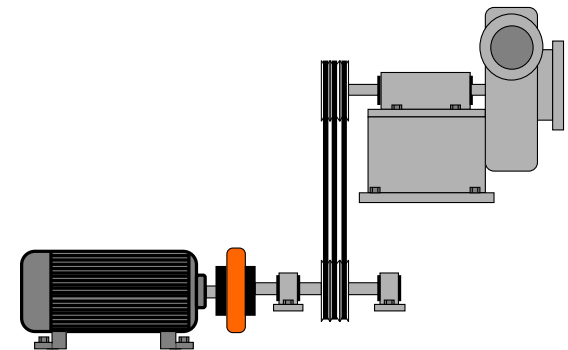
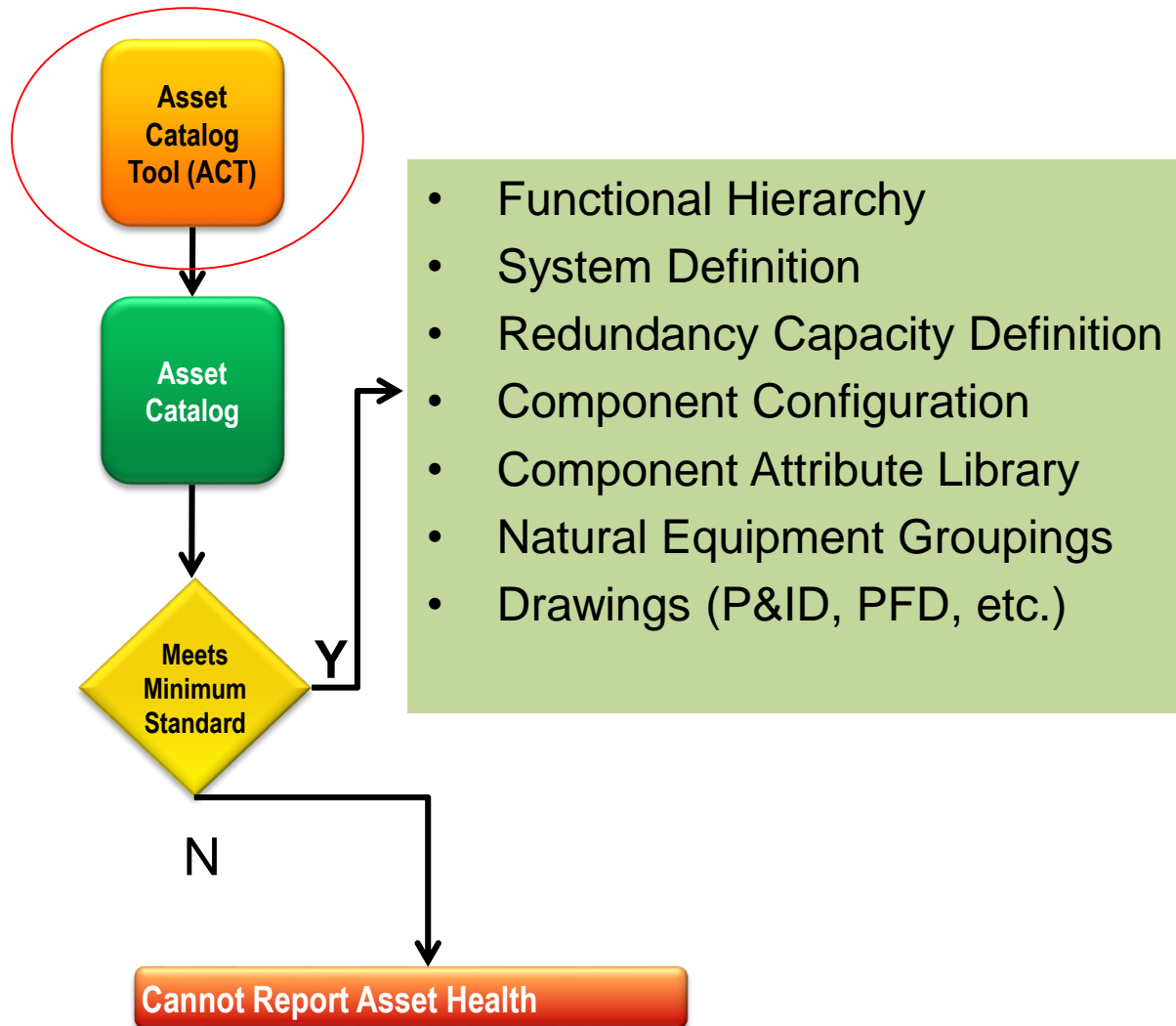
Best practice approach to managing assets:

- **Asset** – items of equipment adding value to plant/process
- **Integrity** – The ability of the equipment to meet its required deliverables without interruption/ unplanned interruption
- **Measure** – The way in which the asset condition is reported (traffic light and %)

Asset Health Assurance Model



Integrity – Assurance Model



KPI's and Performance Parameters

Integrity – Catalogue Tool

Allied Reliability Walkdown Tool v8.33 (Registered)

Enter Attributes: MOTOR - AC

GSK 46 RIX FORMULATION & COUPLING BUILDING PUMP - P-9402

Attach Images

Last Modified By: Kristof
On: 26/03/2010 17:32:19

Available Attributes

1 2

Component	MOTOR - AC	Full Load Current	
Amps	20.0 / 11.5	Fuse Type	
Lube Type	SEALED	Haz Area Cert Number	
RPM	2930	Haz Cat	
Orientation	HORIZONTAL	Hz (frequency)	
Balance Grade		Insulation Class	F
Bearing DE	6309 22/C3 WT	IP Rating	IP55
Bearing DE Type		J-Box Position	
Bearing NDE	6209 22/C3 WT	Location Desc	
Bearing NDE Type		Manufacturer	ABB
Circuit Reference		Material Type	
Coupling Type		Model Number	M3AA 160 MA
Dimensions (L/W/H/D)		Motor Frame	B35
Doc Reference		Phase	3
Efficiency		Poles	2

Save Entry Summary Cancel Entry Expand Data Entry When Double-Clicked

2 HIB HVAC GP RX46.E208D
2 HIB HVAC GP RX46.E211
2 HIB HVAC GP RX46.E223
2 HIB HVAC GP RX46.E224

Close Progress

GSK RIX FORMULATION & COUPLING BUILDING 46 2 FORMULATION WFI DISTRIBUTION PUMP - P-9402

Attach Image

Attached Images

Pump P-9402 Motor.JPG
Pump P-9402 plate 1.JPG
Pump P-9402 plate 2.JPG

Double-Click for full size

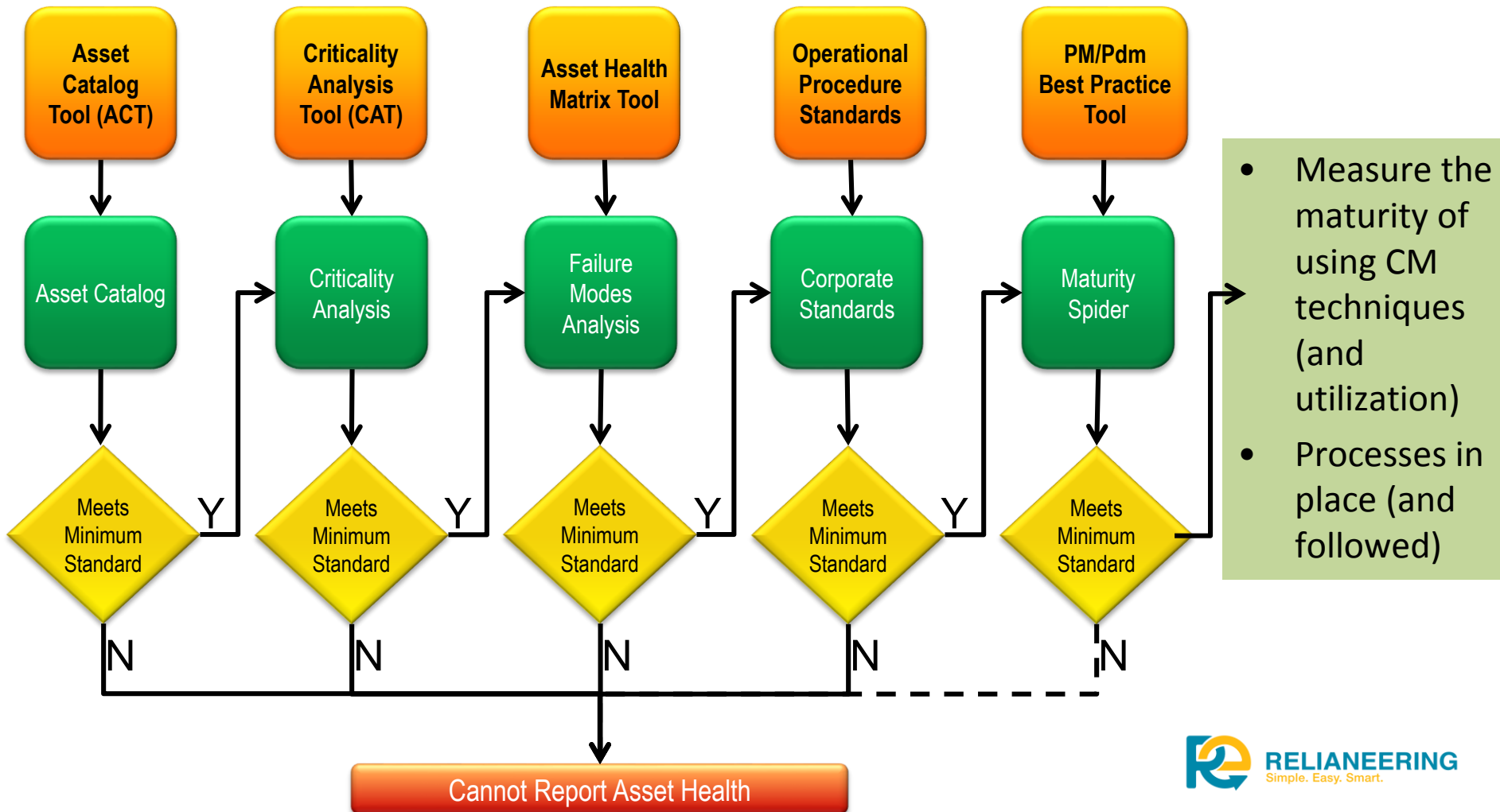
Edit Components

*(COUPLING - FIXED) COUPLING
(MOTOR - AC) MOTOR - AC
*(MOTOR - STARTER) MOTOR - STARTER
(PUMP - CENTRIFUGAL) PUMP - CENTRIFUGAL

Duplicate Components

*=Incomplete

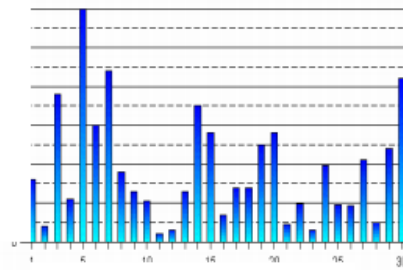
Integrity PM/ PdM Best Practice



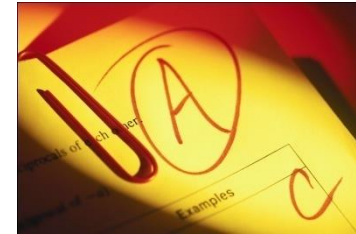
Existing PdM Program Audit by Technology



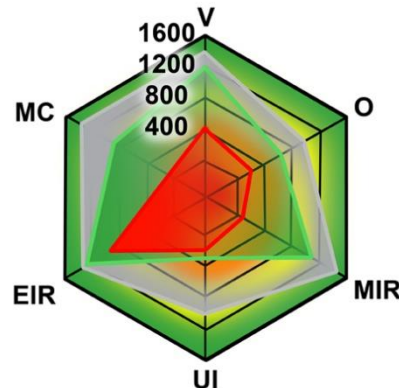
Ask Technology
Specific Questions



Create Technology
Specific Diagram

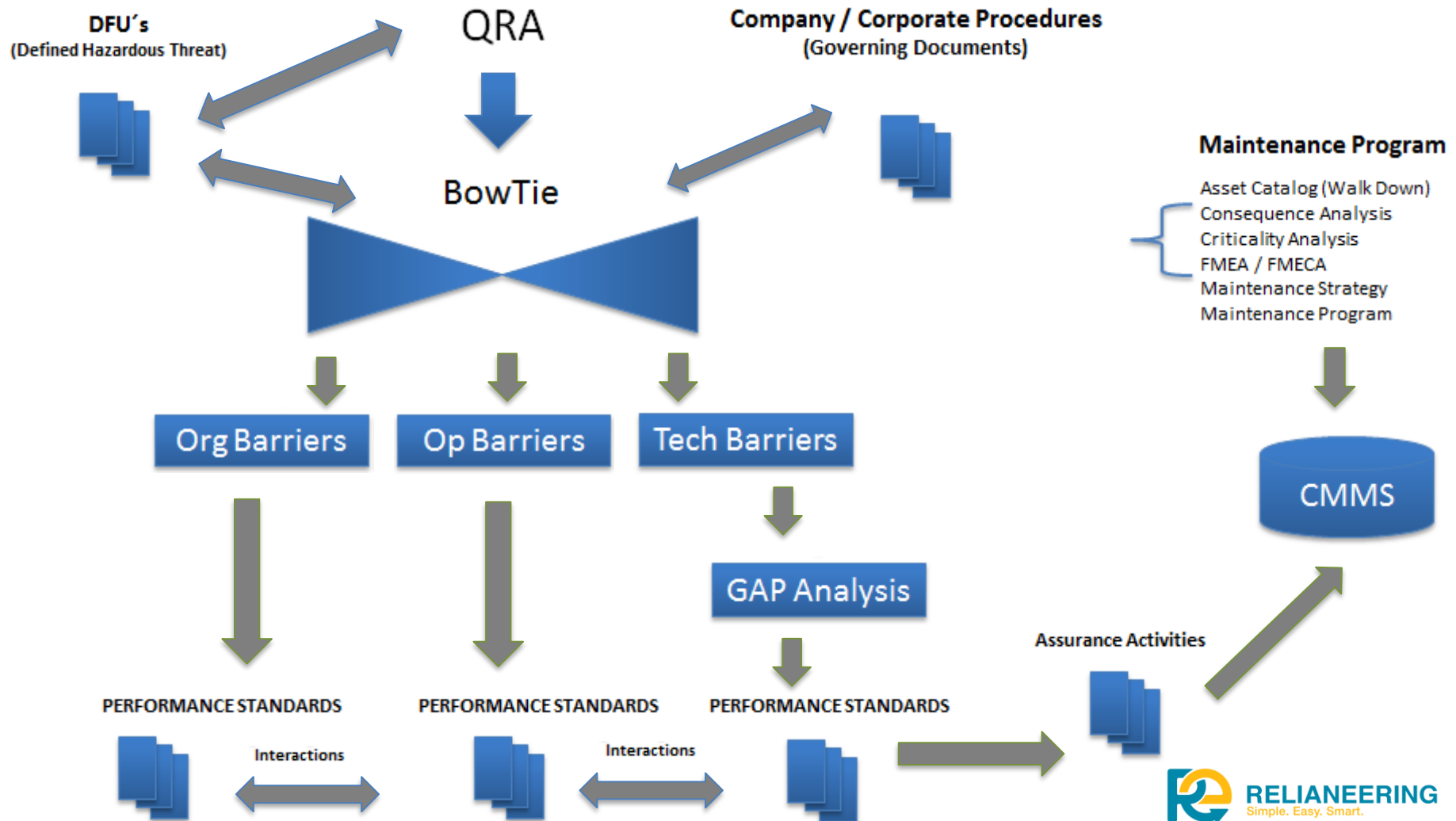


Assign Score - Map
Scatter Diagram to
Maturity Matrix

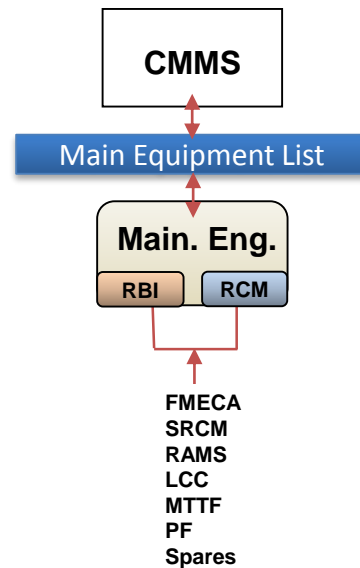


Input Each Technology
Ranking into Spider Diagram

Integrity – Barrier Management Approach



Strategise



Monitor Static Equipment



Infrared



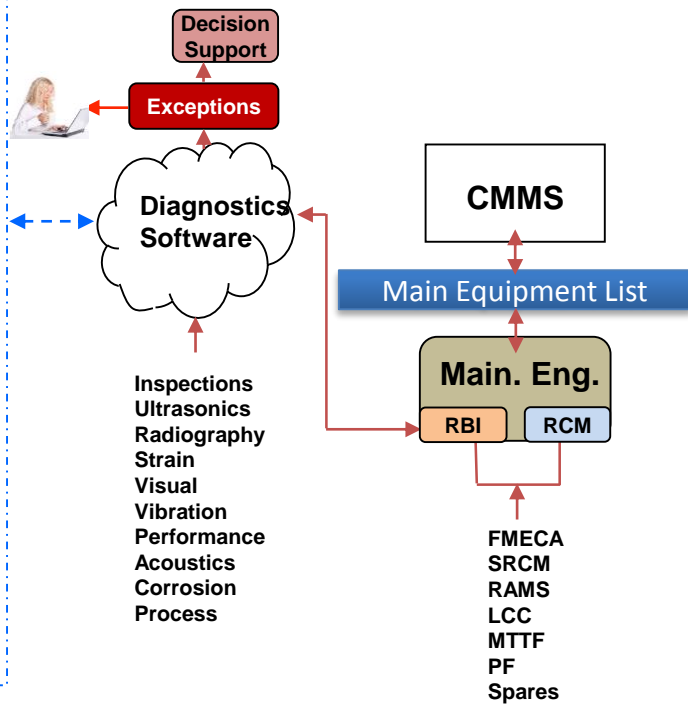
Eddy Current Inspection
of tube stack



Mobile
Inspection

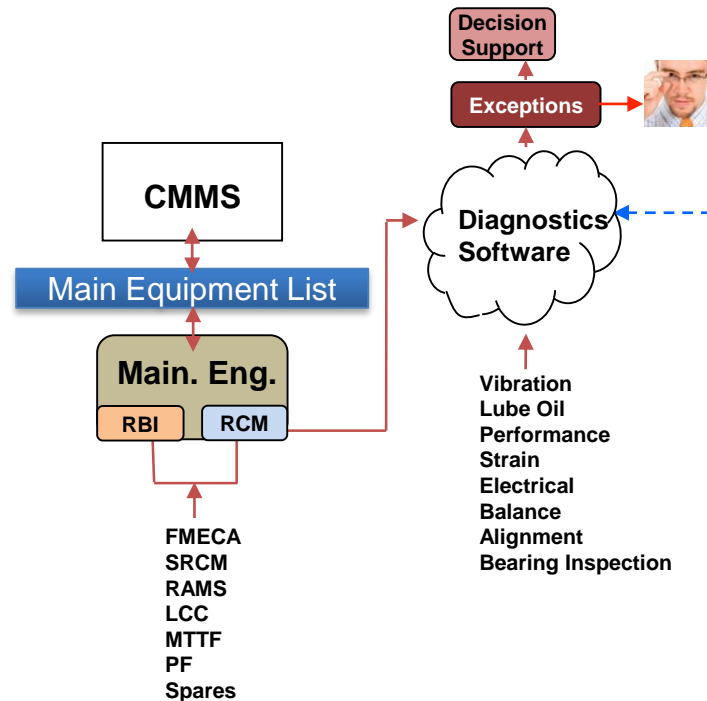


Ultrasonics



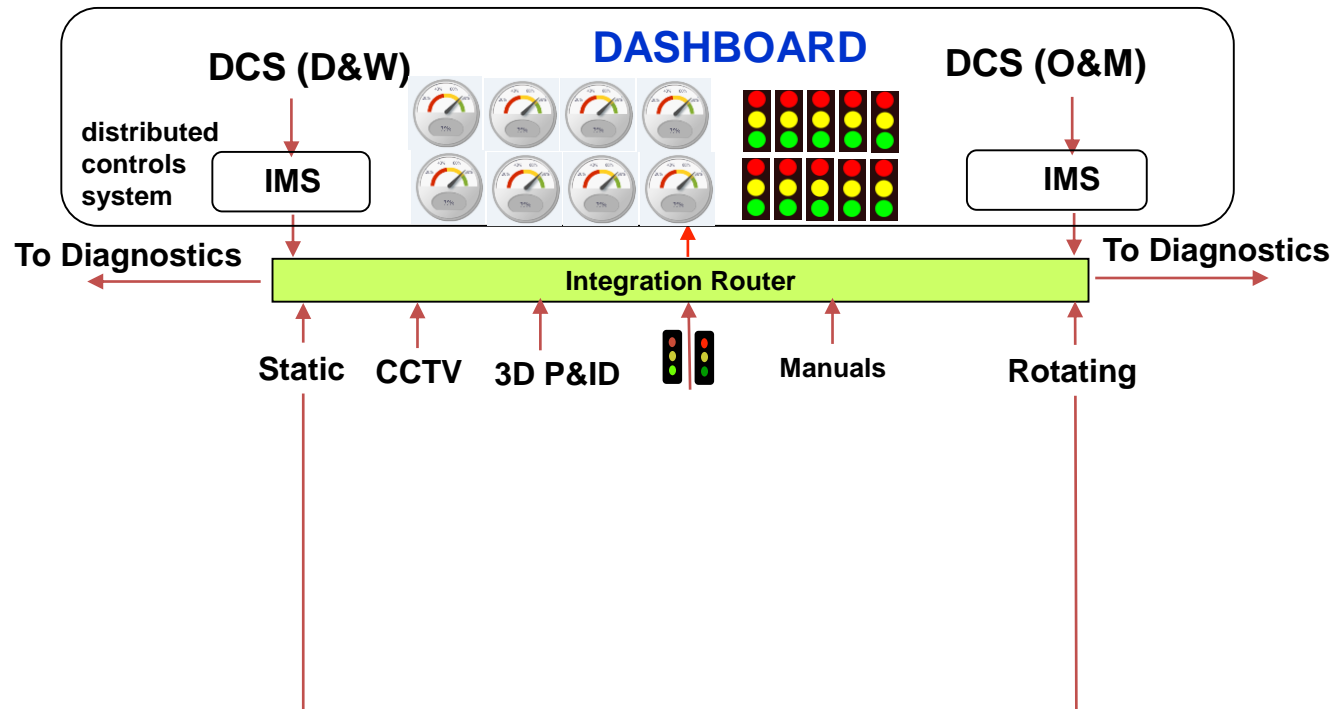
The diagram illustrates the progression of industrial data collection methods through five stages, each represented by an image and a label:

- Offline:** Two workers in hard hats and safety glasses use a tablet computer on a construction site.
- Alignment:** A worker in a white lab coat and yellow hard hat uses a handheld device to align a large blue industrial motor.
- Protection:** A rack of blue industrial control modules, each with a digital display and buttons.
- On-line:** A computer monitor displaying a control interface with various graphs and data points.
- Wireless:** A blue wireless antenna connected to a cable, with a computer monitor in the background.



[illegible]

KPI's and Performance Parameters



PDCA

(Deming cycle)

Plan



Do



Check



Act



Let's **together** replace complexity with
Simplicity

Thank you for listening
*The way we **move***